Multi-Factor Models in Managed Futures, Hedge Fund and Mutual Fund Return Estimation

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Original Version: March 30, 1996
Current Version: December 29, 1996

Preliminary Version: Not for Quotation

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Preliminary: Document:papers:paper:multnew.doc
Tables:MFA:Papers:Tables.doc
Data:MFA:data:mfadata.xls

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Abstract

The past five years have witnessed a dramatic increase in managed futures products whose managers (commodity trading advisors) trade primarily in futures and options markets and which are available to the retail public as well as in hedge funds whose managers invest in both cash and futures markets simultaneously and which are structured primarily for pool investment and not for public sale. Despite this growth, funds invested in managed futures and hedge fund products are estimated to be less than 1% of the over 3 trillion dollar mutual fund industry. One reason for the relatively small percentage invested in managed futures or hedge fund vehicles is that fund investment is primarily based on expected performance. However, in order to determine expected managed futures and hedge fund return, theoretical or empirically based return expectation models are required. For ease of acceptance among the investing public, return expectation models for managed futures and hedge funds should be presented in a form similar to those for which investors are with for stock and bond funds. While extensive literature exists on empirical models of return expectation for stock and bonds, little academic research, however, has directly tested for the underlying factors explaining managed futures and hedge fund return. In this paper, various factors, chosen to capture managed futures and hedge fund trading styles and investment markets, are used to explain managed futures and hedge fund return performance. Similar tests are run on portfolios of traditional stock and bond funds in order to evaluate the relative explanatory power of the multiple factor models.

Results indicate that for the managed futures, hedge fund, and mutual fund portfolios analyzed, a set of factors exist which help in explaining managed futures, hedge fund, and mutual fund returns. These factors are based on the characteristics of the trading style (e.g., discretionary, systematic . . .) and the unique asset markets traded (e.g., currency, financial) of managed futures, hedge funds, and mutual funds. Results indicate that technical trading rule and market momentum variables are shown to capture managed futures return. In contrast, technical trading rules are shown to be less helpful in explaining return movements in traditional stock and bond funds, whose returns are consistent with long positions in underlying cash markets, and hedge funds, whose trading style is often based on capturing undervalued stock or bond investments.

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I. Introduction

The past five years have witnessed a dramatic increase in managed futures products whose managers (commodity trading advisors) trade primarily in futures and options markets and which are available to the retail public as well as hedge funds whose managers invest in both cash and futures markets simultaneously and which are structured primarily for pool investment and not for public sale.[1] Despite this growth, funds invested in managed futures and hedge fund products are estimated to be less than 1% of the over 3 trillion dollar mutual fund industry. One reason for the relatively low level of investment in managed futures and hedge funds is that, as for traditional investments such as stocks and bond funds, investors require both a theoretical basis for their investment in nontraditional investments as well as supporting empirical results. For stock and bond funds, both single factor and multi-factor theoretical models and empirical tests of return formation exist.. For instance, Sharpe [1992] used over fifteen global stock and bond indices to explain the return structure of U.S. equity funds. Elton, Gruber, and Blake [1995] used fundamental economic variables to describe the cross sectional returns of U.S. bond funds.

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[1] In fact, the past five years has also witnessed a dramatic increase on academic research conducted on the potential benefits of non-traditional asset forms. This is due not only to the recent growth or emergence in these vehicles but to the recent availability of researchable data basis which provide historical information on market performance. Within the past two years, research on return persistence in managed futures returns [Elton et al., 1989; Irwin et al., 1994; Schneeweis et al., 1997], survivor bias Elton et al., 1992; Schneeweis et al., 1996], the potential benefits of managed futures in portfolio creation [Chance, 1994; McCarthy et al., 1996, Schneeweis et al,, 1996; Schneeweis 1996] as well as comparisons of the risk and return properties of commonly used passive commodity and active and passive managed futures and hedge fund benchmarks [Schneeweis and Spurgin, 1996, 1997] have been published.

Theoretical models as well as empirical tests of stock and bond return formation, however, may neither fully explain the theoretical basis nor the empirical factors explaining returns to managed futures or hedge funds. Schneeweis [1996] and Fung and Hsieh [1996] point out that hedge fund traders and manage futures commodity trading advisors (CTAs) have different investment styles and opportunities than traditional stock and bond fund managers. These include the ability to trade in multiple markets, take long and short positions, and use varying degrees of leverage. As important while futures and option markets exist in a zero sum gain, that is, daily gains must equal daily losses for market participants, academic research [Schneeweis, 1996; Chan et al., 1996] has shown that the existence of arbitrage returns, convenience yields, and returns to providing liquidity as well as the existence of trending markets due to institutional and market trading characteristics provide a source of postive return/risk tradeoff for CTA and hedge fund managers.[2] Little research, however, exists on the actual market or trading factors that explain the performance of managed futures investments or hedge funds.[3] Previous research has concentrated on either a simple benchmark consisting of the average return of all public funds [Irwin et al., 1994] or a more complex Baysian risk-adjusted beta based CTA benchmark [Schneeweis et al., 1997]. However little research exists on the sources, or factors, that underly these CTA based benchmark returns or the individual public commodity funds/CTAs themselves. Mitev [1995] used traditional factor analysis to explain the differential factors explaining commodity trading advisor returns, however, no attempt was made to strictly identify explainatory variables consistent with those factors.

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[2] The review of number of articles describing various arbitrage activities, the existence of convenience yield, and trending markets is beyond the scope of this article. The cite articles are only several among hundreds which explore their existence.

[3] For general books on the structure of managed futures or hedge funds see Lederman and Klein, 1995 and Chandler, 1995.

Similarly, Fung and Hsieh [1996] also used factor analysis to explain the relative returns to mutual funds, hedge funds, and CTAs and to extract the trading sytles and market factors common to each all. Fung and Hsieh conclude that the number of possible CTA or hedge fund strategies make extension of the single factor CTA benchmarks [Irwin et al., 1994; Schneeweis et al., 1997] or the multi-factor mutual fund models [Sharpe, 1992] unsuitable for describing CTA or hedge fund returns. However, while individual CTA or hedge fund strategies may vary, the fact that they can be grouped into general explanatory factors by factor analysis and/or into common benchmarks by selection criteria used by firms such as Managed Account Reports, EACM, or Barclays, indicates that variables may exist which capture common CTA trading strategies or market based CTA returns.

In contrast to earlier single index regression or factor analytic approaches, this research uses a multi-factor approach to identify the sources of return to a wide variety of actively managed investments, including managed futures, hedge funds, and stock and bond mutual funds. Determination of measureable factors reflecting the return to CTA/hedge fund trading is important, since in the factor loading model, the factors are produced by factor analysis and are thus unspecified, empirical factors (variables) must be specified which reflect the trading styles or markets described by the factor regression or the underlying strategies of the traders themselves. Tests are conducted on both commonly used benchmark indices for stock and bond funds (e.g., Morningstar), managed futures vehicles (e.g., Manage Accounts Reports, EACM, Barclay, TASS) and hedge funds (e.g., Hedge Fund Research, EACM) as well as portfolios of individual stock and bond funds, hedge funds, and CTAs grouped by trading style or market sectors. The study is designed to extend Sharpe style/market regressions by measuring the influence of CTA and hedge fund investment style or trading markets on their return. As such, factors

such as trading opportunities (e.g., arbitrage, value) and trading approach (technical trendfollowing or fundamental) as well as markets traded (e.g., stock, bond, currency, and commodity) are used to explain CTA, hedge fund, and mutual fund return performance. The factors underlying the return patterns of managed futures and hedge funds are shown to differ from those that explain stock and bond mutual funds as well as from each other.

Section II of this paper reviews previous academic results on explanatory return models for managed futures and hedge funds. In Section III, the data and methodology is presented. Since managed futures and hedge funds are capable of profiting from increases and decreases in the price of underlying asset markets, we use both the nominal and absolute value of cash (e.g., S&P 500, Salomon Brothers Bond index, USDX) and futures-based commodity indices (e.g., GSCI) as determinants of managed futures returns. Similarly, since higher volatility may offer managed futures and hedge funds more trading opportunities, intramonth volatility measures (standard deviation and intramonth drawdowns and intramonth drawups) are also tested. In addition, since CTAs and hedge fund managers often base timing decisions on technical trading rules, another proposed explanatory variable, the Mount Lucas Management (MLM) passive futures markets trading index, a moving average index of commodity and financial futures contracts, is used.[4] Results are discussed in Section IV. These results provide evidence that several factors contribute to the return of CTAs and that those factors are different from the factors are often different from those that explain hedge fund and mutual fund stock and bond returns. Similarly, results show that the factors which explain hedge fund returns differ from those which explain managed futures return. Investment implications and conclusions and areas of future research are discussed in the

[4] The MLM index is used primarily due to its industry acceptance and that it exists as a tradeable index. Other time series models may exist which provide a better fit to actual return structures of various technical trading CTAs.

final section. For instance, the results provide evidence that to the degree that underlying stock and bond markets provide explanatory power for traditional stock and bond managers returns but fail to describe the return patterns of managed futures and hedge fund products, while certain trend following and volatility factors help describe managed futures but not hedge fund return patterns, managed futures and hedge funds provide reasonable diversification patterns to traditional stock and bond funds as well as to each other. Future research should focus higher frequency data and unique trading stragies, as the results presented here point to intramonth volatility and market pressure as an important sources of managed futures and hedge fund return.[5]

II. Managed Futures, Hedge Funds, and Mutual Funds Risk/Return Determinants

Theoretical models such as the single index capital asset pricing model and the multi-factor arbitrage pricing theory have been used to describe the basis for returns to traditional stock and bond funds. For stock and bonds, both single factor and multi-factor theoretical models and empirical tests of return formation exist.. For instance, Sharpe [1992] used over fifteen global stock and bond indices to explain the return structure of U.S. equity funds. Elton, Gruber, and Blake [1995] used fundamental economic variables to describe the cross sectional returns of U.S. bond funds.

Theoretical models as well as empirical tests of stock and bond return formation, however, may neither fully explain the theoretical basis nor the empirical factors explaining returns to managed futures or hedge funds. First, the fact that the underlying futures and options markets operate in a zero sum game; that is, daily gains must equal losses for market participants, has led to questions as to the potential benefits of many non-traditional investment vehicles. However, recent academic research [Litzenberger

[5] Since research [Schneeweis, 1996] has shown that CTA return is due to a relatively small number of actual trades, research is required as to the source of these unique return opportunities (e.g., squeezes).

and Rabinowitz, 1995; Clardia and Taylor, 1993; Kapadia, 1995; Chan, Jegadeesh, Lakonishok, 1996] on the existence of convenience yields, market momentum, and institutional features which result in the existence of short term arbitrage or positive potential risk/returns tradeoffs to those providing liquidity has indicated that positive returns may accrue to non-traditional investment managers. Various academic studies [Chance, 1994; Schneeweis, 1996] point out that CTAs and hedge fund traders have different investment styles and market opportunities than traditional stock and bond fund managers. These include the ability to trade in multiple markets, take long and short positions, and use varying degrees of leverage.

Little research, however, exists on the actual market or trading factors that explain the performance of managed futures investments or hedge funds.[6] Previous research has concentrated on a simple CTA based benchmark [Irwin et al., 1994] or a more complex Baysian risk-adjusted beta based CTA benchmark [Schneeweis et al., 1996] in forecasting CTA returns. However, little research exists on

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[6]While publicly available managed futures products (investment vehicles in which the underlying investments are primarily in traded futures and options markets) have existed since the early 1970, academic research on the potential benefits of manage futures was first addressed in Lintner [1983]. Lintner showed that due to the low correlation between managed futures vehicles and traditional stock and bond instruments, that the addition of managed futures to traditional investment vehicles increased the historical Sharpe ratio. During the 1980's research on managed futures concentrated primarily on the high cost of publicly traded managed futures vehicles and the failure of publicly traded commodity funds as standalone investment vehicles when compared to traditional investment alternatives [Elton et al., 1987, 1989].. Moreover, recent research [Schneeweis, 1996] has also shown that previous concerns over the potential benefits of managed futures investment may have been partly due to the unique time period of analysis. For instance, first, public commodity funds in the 1980s invested primarily in agricultural markets due to the lack of futures and options markets in financial instruments whereas today numerous new markets and new investment technologies exists, Second, the high interest rate environment of the early 1980's led to a period specific high benchmark (e.g., a risk-free rate of over 8%) even for assets not correlated with the comparison vehicle. Lastly, management costs and fees have fallen from the early 1980's such that many non-traditional investment vehicles offer cost structures no longer in line with research conducted on alternative investment vehicles during the 1980s.

the sources, or factors, that underly these CTA benchmark returns or the individual CTAs themselves. Mitev [1995] used traditional factor analysis to explain the differential factors explaining CTA returns, however, no attempt was made to identify strictly the explainatory variables consistent with those factors. Similarly, Fung and Hsieh [1996] also used factor analysis to explain the relative returns to mutual funds, hedge funds, and CTAs and to extract the trading sytles and market factors common to each all. Fung and Hseih conclude that the number of possible CTA or hedge fund strategies make extension of the single factor benchmarks [Irwin et al., 1994; Schneeweis et al., 1997] or the multi-factor mutual fund models [Sharpe, 1992] unsuitable for describing CTA or hedge fund returns. However, while individual CTA or hedge fund strategies may vary, the fact that they can be grouped into general explanatory factors by factor analysis and/or into common benchmarks by selection criteria used by firms such as Managed Account Reports, EACM, or Barclays indicates that variables may exist which capture common trading strategies or market based returns. Thus, while in the factor loading model, the factors are produced by factor analysis and are thus unspecified, empirical factors (variables) may be specified which reflect the trading styles or markets described by the factor regression or the underlying strategies of the traders themselves.

For instance, for stock and bond funds, in which investment managers are strictly regulated to hold primarily long positoins in the underlying assets, theoretical and empirical models of return estimation may include the expected return of the underlying assets themselves. In contrast, for investments in investment vehicles such as a hedge fund focuses on market-neutral arbitrage positions, the comparison benchmark may be the risk free rate. However, if the hedge fund focuses on domestic or

international equity/bond investments then U.S. or international equity/fixed income benchmarks similar to that used for traditional mutual funds may be regarded as the standard.

In managed futures investments, where traders in futures and options markets are operating in a zero sum game, the existence of a zero sum game does not restrict futures and options investors from holding positions which offer positive return/risk tradeoffs. Futures and options investors may simply hold positions that mimic the return of the underlying cash asset, which would yield a positive expected return if, as with stock index futures, the underlying asset had an expected return greater the cost of financing. Moreover, given the lower transaction costs of trading in futures and options markets, managed futures returns may in fact offer superior returns to the underlying cash markets for comparable long (short) positions. Furthermore, institutional characteristics and differential carry costs among investors may permit managed futures traders to take advantage of short-term pricing differences between theoretically identical futures, options and cash market positions as well as differential risk transfer needs.. This differential hedging demand may create investment situations were hedgers are required to offer speculators a return for holding unhedged long or short positions. This return to traders for offering liquidity to hedgers desiring to limit losses may exist not only in futures markets but may exist in a wide range of derivative products. For instance, option traders may be able to create positions which offer earn a risk premium in exchange for accepting exposure to certain portions of the return distribution of the underlying security. This return (e.g., convenience yield) can be earned simply by buying and holding a derivative portfolio and is, arguably, the basis for the positive long term return seen in various futuresand or option based commodity index products such as the JPMorgan or the Goldman Sachs commodity index.

The return to managed futures can also stem from the ability of managers to exploit imperfections in the markets for futures and options as well as the market for the underlying cash instrument. Research on traditional investment vehicles (e.g., stocks, bonds, and currency) indicates that investors may underreact to information and, consequently, security prices trend. Trading techniques based on capturing these trends may be profitable.[7] In addition, research on traditional security markets has shown that market prices react to unexpected changes in micro or macro information [Ederington and Lee, 1995; Johnson and Schneeweis, 1993]. Unlike stock and bond fund managers, managed futures accounts have few restrictions on short sales, either institutional (such as the uptick rule) or structural (poor liquidity when short selling small capitalization stocks). Because of the ability of futures traders to take unrestricted short positions, it is not necessary for markets to trend upward or gap upward to make money. In fact, some of the most impressive periods of return for trading advisors have been during periods of poor performance in the equity markets (e.g., October, 1987). While the existence of positive security returns from technical trading rules have been questioned, most studies rely on the high transactions costs of cash markets to rule out profit. Low transaction costs combined with the ability to sell short and utilize leverage may permit technical trading rules to obtain positive returns in markets which, for short time periods, may be mispriced.[8] Access to options markets permits manage futures and hedge fund traders to create positions which offer potential returns due to changes in market volatility.

[7] It is not the purpose of this paper to review the mound of research dedicated to the existence or non existence of liquidity premia, market momentum, ... or the profitability of technical trading rules or call writing. For the purposes of this paper, the existences of extensive and costly proprietory trading operations at some of the largest financial houses is at least somewhat indicative of the potential for short-term trading profits from a wide variety of alternative trading techniques. For recent academic evidence see Chan, Jagdeesh, and Lakonishok, [1996].

[8] These factors could explain the explain some portion of the historical return to the MLM index, which incorporates a trend-following timing rule.

While it is not possible at present to trade volatility directly, it is possible to construct positions (e.g., straddle positions) that derive some of their return from volatility or changes in expected volatility.

Since managed futures can replicate many strategies available to a cash market investor at a lower cost, and allow strategies that are unavailable to cash investors, return models must be based not only on factors that explain traditional asset returns but also on factors unique to managed futures and hedge fund market trading opportunities[9]. Managed futures and hedge funds may thus offer a positive risk-adjusted return that differs from underlying cash markets. Thus, to the degree that different factors explain managed futures, hedge fund, and stock and bond fund returns, managed futures as well as hedge funds may provide investors exposure to unique sources of return, and thus provide an important source diversified return in combination with traditional investment assets.[10]

However, the factors underlying CTA or hedge fund returns have not been fully identified in previous research. Irwin et al. [1994] focused on a simple managed futures benchmark as the best

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[9] For a discussion of the basis of managed futures returns as a natural result of market forces or as based primarily on trader skills, see T. Schneeweis and R. Spurgin, 'Managed Futures: Nature vs. Nurture' Barclays Newsletter [Fall, 1996].

[10]As discussed in footnote one, considerable research exists on the risk reduction benefits of managed futures. In short, academic [Schneeweis et al, 1996] and practitioner [Schneeweis, 1996] literature has shown that the returns of hedge funds and public commodity funds have a low correlation with traditional investment vehicles such as stocks and bonds. The low correlation is especially true for manage futures since while stock and bond funds invest primarily in cash markets and hedge funds invest in both cash and futures markets simultaneously, managed futures funds are restricted to futures and options markets. Moreover, while the correlation between managed futures products and certain hedge funds and stock and bond portfolios is approximately zero, recent research has shown that when returns are segmented according to whether the stock/bond market rose or fell, managed futures are shown to have a negative correlation when these cash markets portfolios posted significant negative returns and are positively correlated when these cash portfolios reported significant positive returns. Thus managed futures many also offer unique asset allocation properties in differing market environments.

forecast of an individual CTAs return while Schneeweis et al. [1997] proposed a single index Baysian risk-adjusted (e.g., beta) benchmark forecast which may capture differential leverage to the underlying benchmark. This research sheds light on how CTAs perform relative to one another, but does not address the underlying source of CTA return.

For CTAs, Mitev [1995] and for CTAs and hedge funds, Fung and Hsieh [1996] used factor analytic approaches to determine the common factors that help explain CTA or hedge fund return patterns. Fung and Hsieh cite five general investment areas (Distressed, Global/Macro, Systems, Systems/opportunistic, and Value) which explain most CTA and hedge funds return variation. Of these five groups, Global/Macro, Systems, and Systems/Opportunistic were determined to be driven by factors not easily explained by the factors common to stock mutual funds, bond funds, Distressed CTA/Hedge or Value CTA/Hedge fund managers. Fung and Hsieh do not determine if the difference in the return groups is due primarily to systems based trading managers, but conclude that the differences occurred in time periods when rallies or severe declines were experienced. Similarly, for CTAs, Mitev suggests a five factor solution that emphasizes the differential CTA trading strategies. Mitev concludes that the CTAs in his sample group primarily on 1) technical or trend following strategies, 2) surprise or stop-loss control models, 3) agricultural markets, 4) spread-strategies (primarily interest rate) and 5) fundamental or global markets. As for Fung and Hsieh, Mitev does not conduct multi-factor regression models aimed at using factors which capture the trading or market conditions consistent with the groupings suggested by the factor models.[11]

[11] The use of derived variables which attempt to replicate the factor loadings in multi-factor regression models is consistent with research conducted in equity research [Chen and Jorden, 1993].

The study is designed to extend Sharpe style/market regressions by measuring the influence of traditional stock fund, bond fund,, CTA and hedge fund investment style or trading markets on stock fund, bond fund, CTA and hedge fund return. As such, factors such trading opportunities (e.g., arbitrage, value), the trading approach (technical or fundamental) as well as markets traded (e.g., stock, bond, currency, and commodity) are used to explain the return performance of CTA, hedge fund, and mutual funds. The factors underlying the return patterns of managed futures and hedge funds are shown to differ from those that explain stock and bond mutual funds as well as from each other.

III. Data and Methodology

This study reports on the results of an empirical model designed to explain the monthly return performance of actively managed stock funds, bond funds, CTAs and hedge funds. Individual CTA and hedge fund data was obtained from the LaPorte. Individual stock and bond fund data was obtained from Morningstar. Benchmark CTA and hedge fund data was obtained from a number of alternative data providers (Managed Accounts Reports, Barclays, EACM, Hedge Fund Research). For individual CTA and hedge funds, style and market groupings were those obtained from LaPorte. For CTA and hedge fund index data, the groupings were determined by the individual data provider (See Appendix I for a summary of the alternative CTA and hedge fund benchmark descriptions). For stock and bond funds, the portfolio benchmarks were determined from those stock and bonds funds with full data over the time period of study and were grouped according to Morningstar definitions (See Appendix II for a summary of the alternative Morningstar fund descriptions). Lastly, for a set of 'diversified' CTAs, 'U.S. Opportunity' hedge funds, and 'Growth and Income' equity mutual funds, fund returns are ranked each month and three portfolio groupings are determined (top five, median, and bottom five). Empirical tests

are run on each of the three groups to measure the existence of abnormal returns for high, average, and low performing fund portfolios. Lastly, individual CTAs and hedge funds were examined. Results are not presented here due to the extensive detail required to seperately individual CTA/hedge fund perforamance. Results, however, are consistent with those described at the portfolio or index level in this paper.[12] Return are derived as follows:

$$R_{i,T} = \left(\mathrm{NAV}_{i,T} / \mathrm{NAV}_{i,T-1}\right) \qquad (1)$$

where,

$R_{i,T}$ = Monthly rate of return for CTA i in period T

$\mathrm{NAV}_{i,T}$ = Total asset value for CTA i in period T

Returns for all data series are expressed as monthly holding period returns. The test period January, 1990 - December, 1995 permits complete analysis of several managed futures and hedge fund indices (e.g., Hedge Fund Research (HFR) and Evaluation Associates Capital Management (EACM)) that started in January, 1990.[13] Statistical tests include presentation of descriptive risk and return characteristics, return correlations between each of the primary and sub-indices using both raw and absolute value of independent variable returns as well as multiple regression analysis between CTA,

[12] Tests were conducted at the individual CTA/hedge fund level. Results are similar to those conducted on individual equities, that is, the explanatory power of the return model show greater variance at the individual CTA/hedge fund level than for portfolio or benchmark return determination.

13 Alternative CTA (e.g., CMA) and hedge fund indices (e.g., Van Hedge), however, data for these benchmarks is provided either only quarterly for the time period of analysis or use a smaller universe. Correlations of these alternative indices with tested indices over common time periods show high levels of similarity.

hedge fund, and stock and bond fund indices and the derived explanatory factors.[14] Basic independent variables include 1) The SP500 total return index and MSCI World index are used as domestic and world equity indices. Salomon Brothers U.S. and World Government bond indices are used as domestic and world bond performance indices 2) the U.S. Dollar Index (USDX) (as calculated by Datastream), 3) the Goldman Sachs total return commodity index (GSCI) are used as benchmarks for traditional currency and commodity asset class performance as well as positive roll yield and collateral (T-bill) return., 4) the MLM index is used to capture returns due to market trends. [15] and 5) the nominal value of a Treasury bill index is used to capture the return on the margin account held by CTA investors.[16] Lastly, the ability of CTAs/hedge funds to take both long and short positions within a given month is modeled as function of intramonth volatility. Measures of intramonth volatility include the calculation of intramonth standard deviation as well as intramonth drawdowns (drawups) daily returns for the S&P 500 equity index, the JPMorgan Government Bond Index, the USDX trade weighted currency index, and the Goldman Sachs total return commodity index are used. Separate tests are conducted on CTA, hedge fund, and mutual fund performance using intramonth volatility measures, including standard deviation, maximum drawups and maximum drawdowns.

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14 The basis for using both raw and absolute returns is that managed futures products often use both long and short positions. Thus managed futures and hedge funds may be correlated with absolute return of the underlying contracts.

[15] A full description of the various CTA, hedge fund, commodity indices, stock and bond indices, and stock and bond fund indices are given in Appendices I-II.

[16] The methodology is patterned after Chen and Jorden [1993] and Sharpe [1992] others who explain stock, bond, and hedge fund as a function of the underlying markets.

IV. Results

A. Managed Futures, Hedge Fund, Stock and Bond Indices: Descriptive Statistics

As for the stock and bond mutual fund industry, performance indices have been created by various private firms to mimic the performance of underlying CTA and hedge fund groups and sub-groups. In Table 1a the average monthly arithmetic returns and standard deviations for the CTA, hedge, stock and bond fund indices as well as variables used to explain CTA, hedge fund, and stock and bond fund returns are presented. [17] For the period analyzed, the mean monthly returns of three of the broad-based CTA indices (MAR Dollar-Weighted, 1.2%; Barclay Index, 0.6%; TASS, 0.7%) differ considerably. Similarly, the monthly returns of the two hedge fund indices (HFR and EACM) also report varying levels of return performance for similar trading style classifications. For instance, the HFR convertible arbitrage strategy reports a monthly return of 1.1% while the EACM convertible hedging strategy reports a .8% monthly return.. There are several plausible explanations for the varying levels of return among seemingly similar performance indices. These include differing CTA and hedge fund selection criteria for CTA or hedge fund inclusion in the various indices as well as differing return determination methods [Schneeweis and Spurgin, 1996, 1997].[18] However, the differing levels of return, however, is not necessarily indicative of different explanatory variables, only the sensitivity of the relative CTA or hedge fund index to the variables. This may be due to differences in leverage as well as differing degrees of risk tolerance. In fact, previous research on the comparisons of alternative CTA and hedge fund indices indicates that the alternative CTA and hedge fund indices track each other especially those

[17] Similar descriptive statistics results were obtained for the 6/94-12/95 subperiod which includes returns for MAR hedge fund indices. Results are available from authors.

[18] For discussion of the relative tracking error within major CTA and hedge fund indices see Schneeweis and Spurgin, 1996, 1997.

CTAs and hedge funds benchmarks with similar style objectives [Schneeweis and Spurgin, 1996 and 1997].[19]

Insert Tables 1a and 1b About Here

Results in Table 1a are consistent with a different return/risk structure for cash, hedge funds, and managed futures indices, whether actively or passively managed. For instance, results in Table 1b, in which the CTA, hedge fund, and mutual fund indices are ranked by their relative information ratio (average return/standard deviation), shows that the relative return/risk tradeoff of the CTA indices differs from hedge fund indices and traditional asset indices (e.g., S&P 500, GSCI) over the 1990-1995 period. Among the active strategies for the period of analysis, hedge fund strategies dominate the return/risk tradeoff while hedge fund and CTA trading styles which concentrated primarily on equity short selling provided the lowest information ratios.

However, the existence of differential returns and/or risk/return tradeoff does not provide evidence as to the actual determinants of return over the time period. In the following sections, univariate and multivariate relationships between CTAs, hedge fund, and stock and bonds funds and indices and the

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[19] However, results in Table 1 are for the entire period. Since, certain hedge fund managers have the ability to easily change investment areas and styles relative to the investment climate, it is important to measure the time period stationarity of the relative performance. The results in Table 1 and Figure 1 also indicate that the various hedge fund indices each reflect their underlying structure.

the nominal and absolute returns for stock, bond, commodity and currency indices as well as measures of intramonth volatility (e.g., intramonth standard deviation) are analyzed.[20]

B. Managed Futures, Hedge Fund, Stock and Bond Indices: Simple Correlations

Managed Future Correlation with Commodity, Stock, Bond and Currency Indices

In Tables 2a-2c, the correlations between the various CTA benchmark subindices in each CTA index grouping (MAR, Barclay, and EACM) as well as the correlations between the various CTA indices (MAR, Barclay, and EACM) and the tested nominal and absolute value factors of the explanatory factors (MLM, GSCI, S&P500, MSCI, Salomon Brothers US (USSB) and World bond (WDSB) indices, PPI, and USDX) are given. Of interest is the high correlations (above .9) between the overall CTA index (CTA$ or Barclay CTA,) and the other CTA subindices. The only low correlations (below .3) are for the correlation between the overall CTA index and the energy or argricultural CTA subindices. Similarly, for all three CTA benchmark samples, a correlation between the general CTA index and the systematic subindices (e.g., CTA trend, EACM systematic, and Barclay systematic) is high (above .9) while the correlation between the general CTA indices and the discretionary indices in each CTA benchmark goup is approximately .5. These results indicate that the predominate number of CTA traders follow systematic or trendfollowing strategies, however, for CTAs who follow discretionary (e.g., mixed markets and strategies) or unique markets (e.g., energy, currency, and agriculture) separate explanatory return variables may be required.

[20] In addition to nominal and absolute values, tests are conducted on the relationships between CTA, hedge fund, and mutual fund performance and intramonth standard deviation and intramonth drawdowns and drawups for the cited indices (S&P 500, JPMorgan bond index, GSCI, and trade weighted currency index). These results are discussed in future sections.

The potential impact of the various explanatory variables on is also shown in Tables 2a-c.. For the variables tested and for each CTA index provider (e.g., MAR, EACM, and Barclay), the MLM index had positive correlations above 0.20 for five of the eight MAR CTA indices, two of the three EACM indices, and seven of the eight Barclay CTA indices.[21] Consistent with the intra CTA correlation patterns, however, the correlation between the MLM trendfollowing passive index was lowest for the energy, currency, and diversified subindices.. These results indicate that different factors may be necessary to capture the returns to the overall CTA indices and several of the CTA subindices.

Insert Tables 2a-2c About Here

The simple correlation results also indicate the overall CTA$ index and the CTA subindices are positively correlated with several nominal return factors (e.g., Salomon Brothers World Bond and USDX) as well as the measured factors which capture months with positive or negative directional return moves (e.g., absolute value). This is especially for CTA subindices, such as the currency CTA index, which focus on the particular market (e.g., USDX).

Hedge Fund Correlation with Commodity, Stock, Bond and Currency Indices

In Tables 3a -3b, the correlation between each of the hedge fund indices (HFR and EACM) and betweem the nominal and absolute value of the explanatory factors and the hedge fund indices are given.

[21]There is little evidence that the MLM index captures return patterns in the currency, energy, or financial return subindices. Similar results are seen in the Barclay currency subindex. This could in part be due to the small currency and energy weighting in the MLM index and the fact that financial markets especially the S&P 500 generally shows little evedence of long term trend following.

Of interest, is the differences, if any, in the correlations patterns of the HFR and EACM hedge funds performance indices given in Tables 3a and 3b with those given in Table 2a and 2b for the MAR, EACM, and Barclay CTAs indices. Three primary differences can be observed. First, in contrast to the results in Tables 2a-2c. for the various hedge fund subindices given there is no case of a correlation of over .90. Thus, amongst hedge fund traders, the various hedge fund traders may be more dissimilar in markets traded or trading styles than in the case of the reporting CTAs. Second, there exists a relatively low and even negative correlation between hedge fund indices and the variable capturing trend following markets, the MLM index [Schneeweis and Spurgin, 1996). For instance, for the EACM hedge fund indices, fourteen of the fifthteen subinidex had correlations below.10 and ten of the fifthteen were negative. (Similar results are presented for the HFR hedge fund indices). Third, also in contrast to CTA indices, hedge fund indices are often positively correlated with long stock and bond positions. Whereas none of the reporting CTA indices had correlations above .20 with the S&P 500, the majority of the EACM and HFR hedge fund indices had correlations above .20 with the S&P 500. The principal similarity between CTAs and hedge fund performance indices is that currency subindices in both asset groups are positively correlated with the absolute value of the USDX rate. Thus, except for these two sets of investments, CTAs and hedge fund advisors seem to be capturing differing return patterns.

Insert Tables 3a-3b about Here

Stock and Bond Fund Correlation with Commodity, Stock, Bond and Currency Indices

In Table 4, the correlation between each of the stock and bond fund performance indices and between the stock and bond fund performance indices and the nominal and absolute value of the explanatory factors are given. Again, of principal interest, is the differences, if any, in the correlations patterns of the CTA and hedge funds performance indices given in Tables 2a-2c and 3a and 3b with those given in Table 4 for the stock and bond mutual funds. The buy-and-hold strategy employed by stock and bond fund managers results in correlation patterns which are very different from broad hedge fund and CTA indices. First, the correlation between the equity based indices are all above.90. A similar high correlation is shown between the government and corporate bond mutual funds. As discussed in previous analysis [Fung and Hsieh (1996) and Schneeweis (1996)], the high intercorrelation among stock and/or bond mutual funds, lessens the potential diversification benefits within those groupings. Secondly while similar to several hedge fund indices and in contrast to CTA indices, the MLM index is negatively correlated with stock funds and has a zero correlation with bond funds. Lastly, in contrast, to both hedge funds and CTAs, there is little evidence of a absolute values of the tested variables on stock or bond mutual fund performance.[22]

Thus based on simple correlation patterns, the moving average trendfollowing returns in the MLM index, and the factor capturing volatility patterns may explain CTA performance the best. These factors are either uncorrelated with stock funds, bond funds, and hedge funds or correlated in the opposite direction, and suggest CTA investment would provide diversification benefits to a portfolio of stocks, bonds, and hedge funds. Hedge funds, on the other hand, share some explanatory factors with

[22] The reported results, i.e., low correlation between commodity benchmarks and equity index, may differ for subindices of the equity index that would be expected to be highly correlated with underlying commodity markets (e.g., mining, energy firms).

stocks and bonds, and so a close examination of the specific strategy employed by the fund is necessary before determining if diversification benefits are available from a hedge fund.

Insert Table 4 about Here

Correlation of Best, Median, and Worst Performing Funds with Benchmark Indices

In Tables 2-4, the correlation patterns are given between the various CTA, hedge fund, and stock and bond portfolio indices and the explanatory factors. In Tables 5-6, results are given as to whether the results in Tables 2-4 are general to the overall sample or are specific to various performing CTAs, hedge funds, or mutual fund managers. In Table 5, the descriptive statistics for the average CTA , hedge fund, and average Growth and Income mutual fund, as well as for an equally weighted portfolio (determined monthly from sorted returns) of the top five performers, the median, and the bottom five are given for the overall samples as well as two subsamples ('Diversified'CTAs and 'US Opportunity" hedge funds). [23]. In all cases the return/risk difference between the top five and bottom five return is significant. The question remains, however, if this performance is due to concentration on different variables or simply better 'manager based' performance given the same basic explanatory return variables.

Insert Table 5 about Here

[23] For discussion of possible survivor bias see Schneeweis et al. [1996]. Correlations between individual CTA, hedge fund, and mutual fund performance with survivor bias and corresponding indices with limited survivor bias were all above .95 indicating that for correlation or regression purposes survivor bias should have little impact on reported relationships.

Correlation of Return Ranked CTAs

In Table 6a the correlation between each of the top performing, median, and lower performing CTAs and the nominal and absolute value of the stock, bond, commodity, and currency indices are given. The average CTA is positively correlated with the MLM index while the correlation with the S&P 500 and MSCI is approximately zero. The MLM correlation for the top five CTAs is consistently lower than for the median or the lower five CTAs, while the absolute value of the MLM correlates more highly with top five CTAs. These results indicate that better performing CTAs may be making unique asset weightings based on fundamental information in contrast to more widely used technical program based trading strategies.

Correlation of Ranked Hedge Fund

In Table 6b the correlations of the average, top five, median and bottom five hedge fund managers are given as well as their correlation with the explanatory factors. In contrast to CTAs (Table 6a), the average hedge fund as well as the average US Opportunity is negatively correlated with the MLM and the correlation with the S&P 500 MSCI is highly positive. The primary difference between average reporting hedge funds and those that are expressly invested in equity issues (e.g., U.S. Opportunity), is that for the low performing group, the hedge funds invested in the equity area also are highly correlated with the S&P 500..

Insert Table 6b about here

Correlation of Ranked Mutual Fund

Table 6c reports the correlation of the average, top five, median, and bottom five growth and income mutual fund managers with the explanatory factors. As with hedge funds (Table 6b), a negative correlation is reported for the MLM index. However, the correlations with the S&P 500, are consistently higher than with hedge funds or CTAs.[24] Results in Table 6c also indicate that the explanatory factors load similarly on the high, median and low performing Growth and Income mutual fund managers. Thus the differential performance for these stock fund managers may be more due to security selection than the general factors tested.

The differences in the impact of the explanatory factors on the CTAs, hedge funds, and growth and income stock and bond mutual fund managers is summarized in Table 6d for four major CTA, hedge fund, and mutual fund indices. As indicated in Tables 6a-6c, stock fund managers load primarily on the S&P 500 (and negatively on the MLM index), bond fund managers on the USSB bond index, while hedge fund managers are correlated with both the stock and bond cash markets and the absolute value of the bond or currency markets. In contrast, the CTAs have their primary correlation with the MLM index and with the absolute value of the bond and currency markets.

C. Factors Determining CTA, Hedge, and Mutual Fund Returns: Regression Analysis

Correlation results suggest the factors determining CTA and hedge fund performance differ considerably from the factors that drive stock and bond fund returns, although hedge funds share some

[24] The negative correlation of the hedge fund and mutual funds with the MLM may be partly attributable to the impact on long positions due to inflationary expectations. Note that for hedge funds and mutual funds a negative correlation also exist for GSCI and PPI, while for CTAs no such relationship exists.

factors with CTAs and some factors with traditional stock and bond fund managers. In this section, regression analysis is used to fit an explicit multifactor model. (The simple correlation relationships between the explanatory variables are given in Appendix III). Results show few examples of pairwise correlations above .5 (one exception is the S&P 500 and the MSCI and the USSB and WDSB bond indices) Thus while low pairwise regressions does not prevent high levels of multi-collinearity among the explanatory variables, the variable signs may be generally regarded as stable). In Tables 7a-7d report the results of a multiple regression using the Morningstar Growth and Income (7a), Morningstar Govt. bond index (7b), the EACM 100 (7c), and MARCTA$ index (7d), as dependent variables and the nominal and absolute values of the S&P 500, GSCI, Salomon Brothers bond indices, MSCI, PPI, and USDX as independent variables. The MLM index and T-bill index are also included to model autocorrelation patterns in underlying cash markets and the return to invested cash position held by the various funds.

Insert Tables 7a-7d about here

Tables 7a and 7b indicate that growth and income mutual funds and government bond mutual funds are primarily driven by the underlying cash index (S&P 500 and USSB, respectively). In neither case was the MLM index a significant explanatory variable. The EACM hedge fund index (7c) has three significant factors: the MLM Index, PPI, and the absolute value of the world bond index. The CTA regression (7d) has one highly significant coefficient, the MLM index, and one marginally significant one, the absolute value of USDX.

Results for the various subindices are reported in the appendices. Mutual fund subindices Growth, Equity Income, Aggressive Growth, Small Company, Corporate Bond, and Multi-sector Bond regression are presented in Appendix IV. These are similar to those described in Table 7a-7b. Subindices of EACM Hedge funds are presented in Appendix V. Regression results are consistent with results in Table 7c,. In Appendix VI, subindices of MAR CTA indices are presented. While the MLM index was the most significant variable in most of the subindices, the absolute value of USDX was a significant coefficient for CTA currency, CTA dollar-weighted, CTA equal weighted, CTA trend following, and CTA financial. The CTA energy index was weighted less towards the MLM and currency, and more towards the energy-heavy GSCI index.

Cash indices are the principal explanatory variables for mutual funds and technical trading indices are the primary explanatory variables for CTA indices. There is variation among subindices that are consistent with the unique trading style or investment market. Moreover, while the overall explanatory power in the mutual fund regressions generally ranged from .80 to .98, hedge fund and CTA regressions generally explained less than 50% of the return variation.

In Tables 8a-8b, regression results for the top five, the median, and bottom five CTAs are presented. Table 8a covers all CTAs (CTAs with full data from 1990-1995) and Table 8b gives results for CTAs listed as Diversified by MAR. If relative investor skill is important (and not just differential leverage or risk factors), the top five should be sensitive to the same variables, but have a positive alpha.. In contrast the median CTAs should have an insignificant alpha while the bottom five CTA should have a negative alpha. Results in Table 8a-8b are consistent with this hypothesis. The best 5 CTAs have a monthly alpha of 5.0%, the median CTA of -1.1% and the bottom 5 an alpha of -12.2%. Results are

similar for the diversified CTA subsample. Thus the return model is both consistent across varying performing CTAs and reflects the excess ex post performance of the CTA sample.

Insert Tables 8a-8b about here

Tables 9a-9b present regressions for top five, median, and bottom five return hedge funds (from among funds with full data from 1990-1995) as well as a subset of hedge funds listed as '.S. Opportunity by LaPorte. As with the CTA sample, if the explanatory model is consistent across all hedge funds, the top five should have positive alpha with loading on similar factors. In contrast the median hedge funds should have an insignificant alpha while the bottom five hedge fund should have a negative alpha. Results in Table 9a-9b are also consistent with this hypothesis, as overall sensitivity to factors is similar across performance groups, but top funds producing alphas of 2.5%, median funds 0.0% and bottom funds -2.1%.

Insert Tables 9a-9b about here

Table 10 repeats this analysis for best, median and bottom Growth and Income mutual funds. Of interest in this analysis is that the average (Panel 1), median (Panel 3) and bottom (Panel 4) funds have only one coefficient significant at the 95% level, the SP500, the top 5 portfolio is sensitive to the SP500 as well as the MLM, the USDX, and the absolute values of the GSCI and SP500. This suggest that top

mutual fund managers are investing differently that other managers, and are positioned to take advantage of movements in currency, commodity markets as well as avoid losses in stock market downturns.

Insert Table 10 about here

D. Market Volatility Impacts and CTA, Hedge Fund, and Mutual Fund Return

Recent research [Schneeweis et al., 1996) suggests that CTA return is positively related to market volatility while equity and bond market returns are negatively related to market volatility. In the previous sections, market volatility was not directly tested desire to keep the model as parsimonious as possible. In Tables 11, 12, and 13, regression results for the CTA, hedge fund, and mutual fund benchmark indices are presented in which intramonth market volatility (standard deviation) measures are included as explanatory variables.

Insert Tables 11, 12, and 13 about Here

Results in Table 11 indicate two important additions to the explanatory return model given in Table 8. First the intramonth volatility variable is included, the significance of the MLM index in Table 8 decreases while that of the absolute value of the USDX increases, while the intramonth SD has a negative sign. These results are consistent with CTAs return not being strictly related to volatile markets, but markets which are trending or offer large intramonth moves. These results are generally consistent across

all panels in Table 11 and are especially significant for panel 5, Currency CTAs. Results in Table 11b-c also show that as for Table 8, the strength of the explanatory factors is consistent across the high, median and low performing CTAs.

Results in Table 12, for hedge funds, indicate that when the intramonth volatility variables are included and the MSCI is removed, the overall explanatory power remains fairly constant. However, for hedge funds whose style or investment is equity market related, the significance of the S&P 500 as an explanatory variable is increased. This is consistent with the high pairwise correlation between the S&P 500 and the MSCI (Appendix III). Similar to results in Table 11b-c, results in Table 12b-c indicates that the strength of the explanatory factors is consistent across the high, median and low performing hedge funds..

Results in Table 13 for mutual funds, indicate that when the intramonth volatility variables are included and the MSCI is removed, the overall explanatory power remains fairly constant. Similar to hedge funds, the significance of the S&P 500 and SB Bond as an explanatory variable is increased when the MSCI and WDSB indices are removed. This is consistent with the high pairwise correlation between the S&P 500 and the MSCI as well as between the two bond indices. . Similar to results in Table 11b-c and 12b-c, results in Table 13b indicates that for Growth and Income mutual funds the strength of the explanatory factors is consistent across the high, median and low performing funds. Differences do exist, however. For instance, for equity based mutual funds, the intramonth volatility factor for the S&P 500 is negatively correlated with returns, in contrast to the more general positive relationship for CTAs or hedge funds. These results are consistent for the overall index and across the various levels of mutual fund returns (though not all have statistically significant coefficients). In contrast the influence of intramonth volatility on hedge funds and CTA performance is dependent on the style and area of

concentration. These results demonstrate that CTAs may offer some diversification advantages in markets with high levels of ex post market volatility. Moreover, as expected, measures of market risk should also be considered as additional factors in explanatory models of CTA, hedge fund, and mutual fund returns. This may be especially true for managers whose performance may be directly related to changes in market volatility such as options investors.

E. Trading Style and CTA, Hedge Fund, and Mutual Fund Return

Correlation Relationships

Previous results suggest that CTA return is positively related to market trends while hedge fund and mutual fund returns are more closely associated with the performance of the underlying markets and market volatility. In this section, we further explore these sources of return by correlating the returns of the average top five, median, bottom five performers with various measures of intramonth price movement. (e.g., the intramonth standard deviation, the intramonth maximum drawdown, the intramonth maximum drawup). For CTAs in Table 14a, results are consistent with past results which show, with the exception of currency, a low correlation with intramonth standard deviation.

In contrast, to Table 14a, hedge fund (Table 14b) and growth and income mutual fund (Table 14c) performance is generally positively correlated with index drawups while offering mixed response to drawdowns; that is, hedge funds and mutual funds have positive returns in months with high returns.. Results for Growth and Income mutual funds also show a general negative relationship with market volatility. For the top five performers, however, this relationship is generally less negative.

Insert Tables 14 About Here

Regression Relationships

Table 15 reports the results of regressing the CTA$ index on the mean return, standard deviation, monthly drawups and drawdowns for the respective indices. The explanatory power is similar to than of previous models indicating that CTA return is highly correlated with large intramonth movements.[25] However, results are different than Tables 11 in that the standard deviation is often less significant in the presence of intramonth drawdowns and draw ups. In addition, the return relationship with intramonth drawups and drawdowns indicates that for the time period analyzed a consistent positive relationshps in both up and down markets for fixed income related products. Results were mixed for other markets.

In order to determine better if the returns in Table 15 were related to short term price movements or related to longer term trends, in Table 16, the MLM index is included in the regression (intramonth standard deviation of cash indices is dropped). The overall explanatory power remains similar when the MLM index is added. Of greater importance is that both the MLM and the maximum drawdowns and drawups are statistically significant, suggesting both long term trends (MLM) and short term volatility/trends are sources of CTA return. This analysis suggest future research on the sources of CTA return should use daily data, preferably for both benchmark factors and for CTA returns, as monthly analysis appears to overlook an important source of return.

Insert Table 15 and 16 about Here

[25] Similar tests conducted on the average rate of return for hedge funds and mutual funds. These tests indicate little direct association with intramonth movements for traditional stock and bond funds and hedge funds.

V. Implications of Results

Previous research on CTA performance concentrates on single factor models as an indicator of future returns. Generally, the factor selected is the contemporaneous performance of other CTAs. In this paper, a number of factors are proposed to explain a broad range of managed assets, including CTA, hedge fund and mutual fund return performance. Results indicate that these factors may help explain the differences in investment return between CTAs, hedge funds, and traditional mutual funds, as well as some of the differences within each investment grouping. For instance, CTAs are found to have a set of explanatory factors based on the CTAs trading style (e.g., discretionary or systematic) and the unique asset markets traded (e.g., currency, financial, agricultural). The MLM index, which was designed to track the underlying returns to systematic (technical trend following) trading rules, provides explanatory power for CTA and hedge funds which follow such strategies as well as broad indexes of CTAs and hedge funds.. Factors designed to capture market volatility may also provide return in certain CTA and hedge fund products. In contrast, technical trend following trading rules are shown to be less helpful in explaining return movements in traditional stock and bond funds as well as for hedge funds whose trading style is primarily based on capturing undervalued stock or bond investments.

Adding managed futures and hedge fund products to traditional stock and bond portfolios only makes sense if these products derive return from sources unique from those that drive stock and bond return, and if, furthermore, the returns from those sources are positive. If this is the case, and results reported here support this, then alternative investments provide beneficial diversification to traditional stock and bond funds. In addition, results in this paper suggest that managed futures derive returns from different sources than hedge funds, and so managed futures provide diversification benefits to hedge fund

investment (and vice versa). Lastly, future research is required to develop passive investment approaches that capture the these unique factors more precisely. Unlike equity or bond mutual funds, the lack of a single factor that describes the return process means that CTA and hedge funds must be classified according to their style rather than a general return process. Alternatively, the fact that each position in a fund may draw from a unique return source, a detailed breakdown of the individual positions in a fund may be required to understand the expected return. Results presented in this paper suggest both of these areas of research contain important information about the returns to actively managed assets in general and managed futures and hedge funds in particular.

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Appendix I

Alternative Commodity and Managed Futures Indices

Mount Lucas (MLM) Index differs from other indices in two important ways. First, it allows both long and short positions in the underlying futures contracts. Second, it incorporates financial and currency futures (but not stock index futures) into the index, along with the commodities tracked by other indices. The index is an equally weighted average of the monthly returns from 25 separate futures contracts. Within each market (e.g., corn futures), the index will be long or short depending on whether the contract is above or below its trailing 12-month moving average. MLM is a total-return index. It was launched in May, 1989.

Managed Account Reports (MAR) tracks the performance of individual CTAs as well as CTA Funds and Pools that invest in individual CTAs. MAR produces several performance indices, the dominant being the CTA equal-weighted and dollar-weighted indices. MAR classifies CTAs into a number of different groups, and publishes each group's performance index. These groups are currency, energy, financial, diversified, discretionary, and trend-following. MAR also reports the following subindices for fund and pool performance: guaranteed, multi-advisor, single-advisor, private pools, and public pools.

Barclay Trading Group, publisher of the Barclay Managed Futures Report, also creates CTA performance indices. Indices are based on monthly returns of CTAs with established track records. Barclay publishes an equal weighted index of all CTAs as well as the following subindices: agricultural, currency, diversified, energy, financial/metal, discretionary, and systematic.

Hedge Fund Research, EACM, Van Hedge and MAR offers historical managed futures/hedge fund performance on an array of indices and subindices designed to capture the return to unique managed futures/hedge fund strategies. These indices include relative value, event-driven, equity hedge funds, global asset allocators and short selling. Subindices include long/short equity, convertible hedge, bond hedge, rotational, deal arbitrage, bankruptcy, and multi-event. For managed futures, the principal subindices include discretionary and systematic groups.

Morningstar Stock and Bond Fund indices are derived as the equal weighted returns to stock and bond funds listed in Morningstar Ondisc data system. Funds are classified from the Morningstar groupings.